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INSECTS OF SAMOA
AND OTHER SAMOAN TERRESTRIAL
ARTHROPODA

PART VI. DIPTERA

FASC. 4. Pp. 177-213

EMPIDIDAE AND PIPUNCULIDAE

By J. E. COLLIN

SYRPHIDAE

By FRANK M. HULL

CLUSIIDAE (HETERONEURIDAE) AND
SAPROMYZIDAE

By J. R. MALLOCH

WITH FIFTEEN TEXT-FIGURES



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INSECTS OF SAMOA

AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

Although a monograph, or series of papers, dealing comprehensively with the land arthropod fauna of any group of islands in the South Pacific may be expected to yield valuable results, in connection with distribution, modification due to isolation, and other problems, no such work is at present in existence. In order in some measure to remedy this deficiency, and in view of benefits directly accruing to the National Collections, the Trustees of the British Museum have undertaken the publication of an account of the Insects and other Terrestrial Arthropoda collected in the Samoan Islands, in 1924-1925, by Messrs. P. A. Buxton and G. H. E. Hopkins, during the Expedition of the London School of Hygiene and Tropical Medicine to the South Pacific. Advantage has been taken of the opportunity thus afforded, to make the studies as complete as possible by including in them all Samoan material of the groups concerned in both the British Museum (Natural History) and (by courtesy of the authorities of that institution) the Bishop Museum, Honolulu.

It is not intended that contributors to the text shall be confined to the Museum Staff or to any one nation, but, so far as possible, the assistance of the leading authorities on all groups to be dealt with has been obtained.

The work is divided into nine "Parts" (see p. 3 of wrapper), of which the first eight are subdivided into "Fascicles." Each of the latter, which appear as ready in any order, consists of one or more contributions. On the completion of the systematic portion of the work it is intended to issue a general survey (Part IX), summarising the whole and drawing from it such conclusions as may be warranted.

A list of Fascicles already issued will be found on pp. 3 and 4 of this wrapper.

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INSECTS OF SAMOA

PART VI. FASC. 4

DIPTERA

EMPIDIDAE AND PIPUNCULIDAE

BY J. E. COLLIN

(With 7 Text-figures)

EMPIDIDAE.

AMONG the Diptera collected in Samoa by Messrs. Buxton and Hopkins, this family is represented by four species of *Syneches* (Hybotinae) and one of *Drapetis* (Tachydrominae). Both genera have a wide distribution, but *Syneches* is more confined to subtropical regions than *Drapetis*.

Syneches Walker.

The Samoan species of *Syneches* are very closely allied, and belong to a group having the hind femora only slightly dilated, without spines beneath, but with 3-5 shorter or longer anteroventral bristles, and wings with the stigma not extending to the end of the marginal cell. The head is also more semicircular in profile than usual, without the flattening of the upper part so conspicuous in some species, and without any great difference in size, or sharply marked dividing line, between the upper and lower facets; the ocellar bristles are well developed, but the ocellar tubercle is small; the third antennal joint is longer than deep; the thorax is strongly arched, but the arch is rounded and not pointed; the disc bears scattered hairs, and there is a depression in front of the scutellum with a pair of strong dorsocentral bristles at the upper end of this depression and therefore some distance from the scutellum, this latter bearing one pair of

long bristles, and a few much shorter hairs. The prothorax above the base of the front coxae bears 2-3 tiny, downcurved hairs (omitted in fig. 1) instead of the usual upcurved one. So far as I can trace, this combination of characters is unusual in *Syneches*.

TABLE OF SPECIES.

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
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| 2. (3) Hind femora not conspicuously pale about base | <i>alienus</i> , sp. n. |
| 3. (2) Hind femora conspicuously yellowish on basal third | |
| 4. (5) Hind femora with 3-4 long bristles (quite twice as long as femur is thick) on not more than apical two-thirds. Pterostigma elongate | <i>devius</i> , sp. n. |
| 5. (4) Hind femora with 5-6 shorter bristles (hardly longer than femur is thick) extending right to base. Pterostigma almost quadrate | <i>brevispinus</i> , sp. n. |
| 6. (1) Disc of thorax brightly shining black, microscopic dust limited to prescutellar depression, extreme front of thorax, neighbourhood of postalar calli, and scutellum | sp. <i>indet.</i> |

1. *Syneches alienus*, sp. n. (Text-fig. 1).

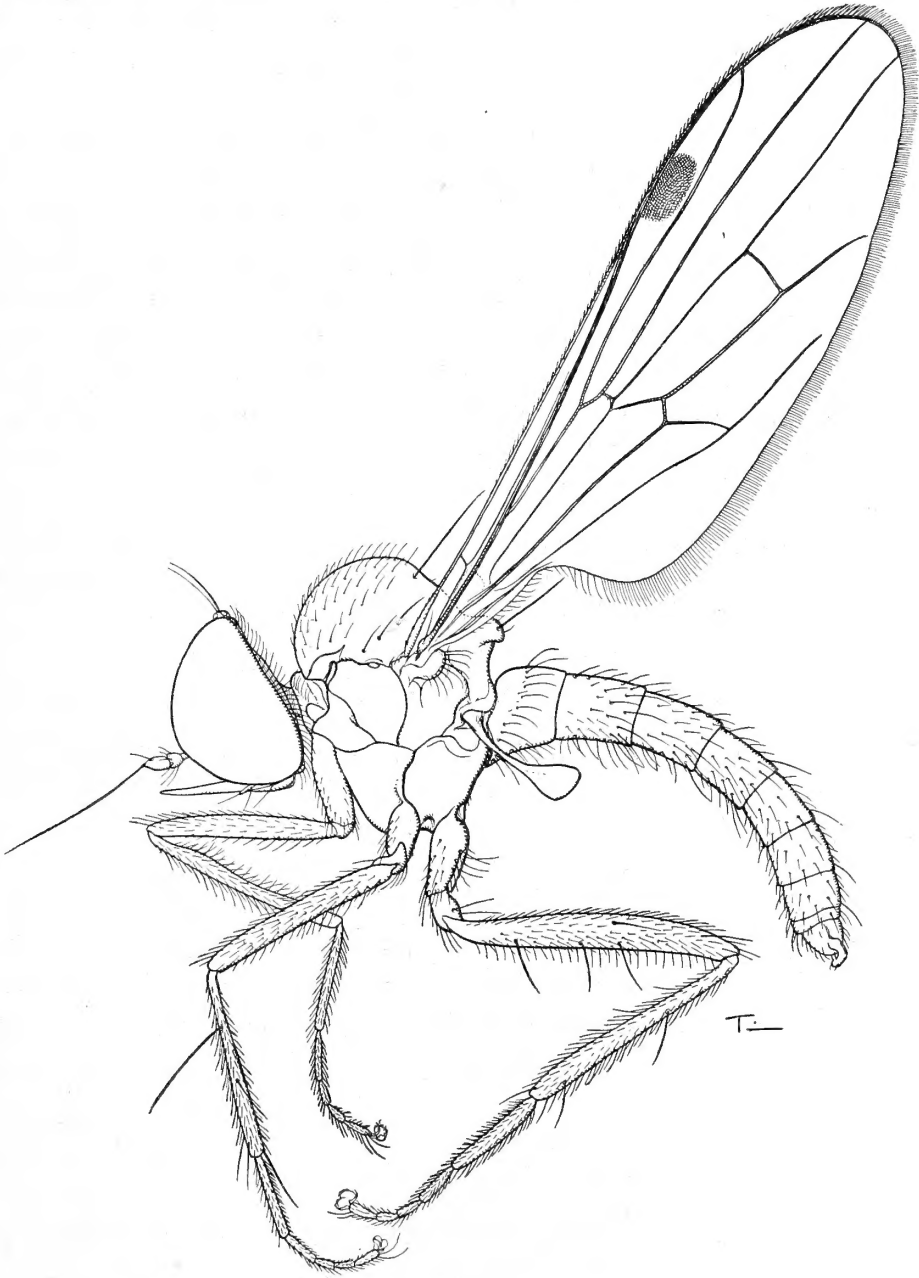
♂. *Head*: *antennae* below middle of head, black, clothed with brownish dust, arista bare. Occiput black, clothed with brownish dust, pubescence on upper part confined to a single postocular fringe, but spreading out in middle on to the more convex portion of occipital region. Proboscis tawny; palpi dark.

Thorax black, slightly shining from all points of view in spite of brownish dust; corners of humeri and postalar calli yellowish. Multiserial acrostichals and uniserial dorsocentrals short and dark, not much longer than third antennal joint; a pair of strong dorsocentral bristles in front of prescutellar depression, a diagonal row of three notopleural, a smaller postalar and a pair of strong scutellar bristles.

Abdomen coloured and dusted like thorax, with, in addition to the numerous short dark hairs, long bristly hairs on basal side margins of first segment and on hind margin at sides of other segments, becoming successively shorter towards tip of abdomen. Hypopygium small and inconspicuous.

Legs very dark tawny, hind pair almost black, front and middle femora not quite so dark, front and middle tibiae and tarsi still less so, conspicuously clothed with brown pubescence and with following bristles: a very long, strong, anterodorsal bristle at basal third of middle tibia, a shorter one behind at middle, at tip a posteroventral spur of similar size and a shorter anteroventral one. Hind femora with three long, anteroventral bristles on middle half (basal

one separated from other two), a shorter bristle in front well beyond middle,



TEXT-FIG. 1.—*Syneches alienus*, sp. n. ♂.

and another towards tip. Hind tibiae with an anterodorsal bristle just below basal third, and a short, anteroventral spur at tip. In addition, a bristly hair

both above and below at tip of front tibiae, and above at tip of four posterior tibiae; three equally spaced, very short but distinct, anteroventral bristles on middle tibiae, and a row of fine, bristly hairs anteroventrally on hind tibiae, almost hidden in longer pubescence there.

Wings slightly brownish, veins dark except at extreme base of wing. Stigma very distinct, somewhat quadrate, rather longer than deep, and not quite extending downwards to radial vein; stigma beginning at end of subcostal vein and ending farther than its own length from end of radial vein. First section of discal vein rather longer than next, which forms upper margin of discal cell. Middle cross-vein exceedingly close to pointed base of discal cell. Third posterior cell somewhat narrowed towards its end, owing to the curve of faint anal vein. End of discal cell much more than length of its terminal cross-vein from end of fifth vein. Halteres black, with yellow base to stem.

♀. Very similar in all respects to ♂. *Abdomen* ending in a pair of short, flattened, pubescent lamellae, looking like another short, narrow segment.

Length about 2.5 mm.

Upolu: Vailima, 3 ♂, 1 ♀, 26.iii.1925.

The differences between this species and the Fijian *Syneches pullus* Bezzi (*Dipt. Brachyc. & Atheric. of the Fiji Is.*, p. 54, fig. 17, 1928) are greater than the respective figures would seem to indicate. *S. pullus* has the upper part of eyes flattened and the facets on the flattened part very large—very much larger than those below.

The anteroventral bristles on the hind femora are more spinose, and just behind these bristles (rather more beneath the femora) there is a second row of short spines, which is completely absent in *S. alienus*. Bezzi describes the thorax of *S. pullus* as "quite bare"; this is not entirely correct, for there are a few tiny hairs as indicated in the figure; but in *S. alienus* the hairs are conspicuous.

2. *Syneches devius*, sp. n.

♀. Very much like *S. alienus*, but differing in colour of legs, shape of pterostigma, and length of pubescence on thorax and legs.

Eye-facets slightly larger, but, as in *S. alienus*, no sharp division between larger and smaller facets, while latter are confined to posterior eye-margin and extreme lower part of eye.

Thoracic pubescence longer, noticeably so behind the pair of strong dorso-central bristles.

Legs paler; front legs, hind trochanters and basal third to half of hind femora yellow, hind tarsi somewhat tawny. Pubescence longer, especially so behind front tibiae, behind first joint of front tarsi, behind middle tibiae (where some hairs stand out almost as fine bristles), and beneath hind femora and tibiae, some hairs beneath latter being also almost like fine bristles. Hind femora with an extra dorsal bristle near tip, close to the more apical of the two usual anterodorsal bristles.

Wings with stigma not quite so dark as in *S. alienus*, longer and not so quadrate, its length fully equal to half distance along costa between subcostal and radial veins. Middle cross-vein about its own length from base of discal cell.

Length about 2.5 mm.

Type and 4 paratypes.—Upolu: Malololelei (Buxton and Hopkins). Savaii: Salailua, and Safune, rain forest, 2,000–4,000 feet, v.1924 (Bryan).

3. *Syneches brevispinus*, sp. n.

♀. Resembling *S. alienus* in shortness of pubescence and shape of pterostigma, and *S. devius* in colour of legs.

Ocellar bristles somewhat shorter than in *S. alienus* and very much shorter than in *S. devius*.

Thoracic pubescence about as in *S. alienus*.

Pubescence on *legs* shorter than in *S. alienus*, especially behind front tibiae and beneath hind tibiae. All bristles much shorter; anterodorsal bristle on middle tibiae about one-third of length of that in *S. alienus* (only about half length of first tarsal joint), and bristle behind middle tibiae very short. Antero-ventral bristles on hind femora more numerous and short, that nearest base close to base of femur; no dorsal bristle towards tip of hind femora such as is present in *S. devius*. Anterodorsal bristle on hind tibiae very short. Colour of legs similar to that in *S. devius*, but hind tibiae broadly yellow about base.

Pterostigma quadrate, very distinct, deeper than in *S. alienus*; radial vein curved downward opposite stigma to accommodate it, and therefore more undulated than in *S. alienus*. Middle cross-vein barely its own length from base of discal cell.

Length probably about 2.25 mm.

1 ♀ (type). Savaii : Safune, rain forest, 2,000–4,000 feet, 3.v.1924 (Bryan). This type is in the Bishop Museum, Honolulu.

4. *Syneches*, sp. ?

This species is certainly distinct from the others by reason of its more shining thorax and different pubescence on the legs, but the single female before me is much damaged and has neither wing complete, so that the necessary full description cannot be given.

There is no question of dust on the thorax having been rubbed off, because the short dark hairs (similar in length to those of *S. alienus*) are present undamaged. The ocellar bristles are very long as in *S. devius*, with which species it also agrees in the colour of the legs, except that the coxae and trochanters are all yellow. The chief difference in the leg pubescence from *S. devius* lies in the presence of still more distinct long bristly hairs behind the front and middle, and beneath the hind tibiae ; there are especially two long bristly hairs behind the middle tibiae standing out at right angles to the shaft, and antero- and posteroventral rows of bristly hairs beneath the hind tibiae. The remaining portion of one wing shows that the stigma is probably as in *S. devius*.

Length quite 2.5 mm.

Savaii : Salailua, 1 ♀, 23.v.1924 (Bryan).

Drapetis Meigen.

The single species of *Drapetis*, while appearing to be congeneric with *D. exilis* Mg., exhibits certain differences some of which may be of importance. The second antennal joint bears a small but distinct bristle beneath, and, while there are two pairs of ocellar bristles, there are no vertical bristles. The eyes are practically in contact below the antennae. Seen in profile the head is more globular and the disc of the thorax less raised above the level of the prothoracic "collar" ; the disc is bare, and though obviously "rubbed" in all the specimens before me, cannot, I think, even normally be clothed as in *D. exilis* ; at most I suspect only uniserial tiny dorsocentral hairs, of which I find traces ; there appears to be no distinct prescutellar dorsocentral, but there is an upcurved humeral bristle. Venational differences include the shortness of the subcostal vein, which ends practically opposite the middle cross-vein ; the radial vein is

also very short, ending very little beyond the middle of the wing, with its short curved prefurca arising from the subcostal vein near the end of the latter. The anal angle of the wing is not at all developed, and the last section of the postical vein is distinctly curved downwards towards the wing margin at the tip.

5. *Drapetis savaiiensis*, sp. n. (Text-fig. 2).

♂. *Frons* shining black, narrowing towards front where it is almost as wide as second antennal joint. Eyes microscopically pubescent. Occiput clothed with brownish dust, but having a shining postocular ring, narrow above and below, but much widened in middle because of concavity of eye-margin there. Two pairs of long ocellar bristles, front pair parallel, hind pair divergent; only fine dark hairs on vertex and back of head. Antennae with third joint slightly longer than first two joints together, and in addition having its upper angle prolonged so that it looks like base of arista; from end of this prolongation proceeds at a slight angle the long microscopically pubescent arista. Palpi dark, small and ovate.

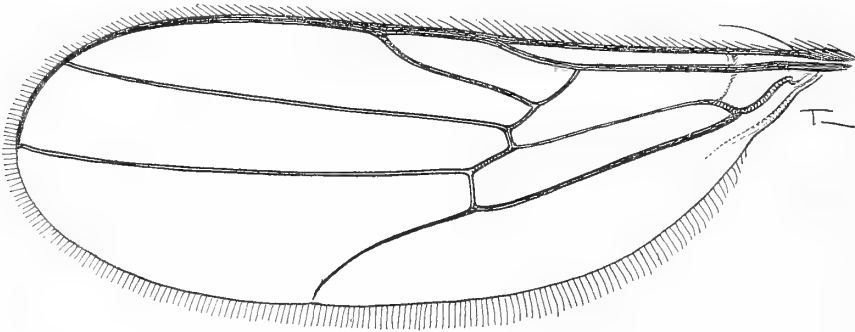
Thorax black, shining and apparently bare on disc, except for postalar calli and scutellum, which are clothed with brownish dust. Prothorax and upper part of pleurae also clothed with brownish dust, leaving lower part of sterno- and hypopleurae shining. An upcurved humeral bristle; a row of 3-4 bristles above root of wing, of which front two are stronger and probably represent notopleural bristles; a small postalar, and a pair of strong apical scutellar bristles placed close together.

Abdomen dull brownish-yellow and apparently not much chitinized, except for hypopygium, which is blacker. Pubescence short and dark, longer on hind margin of last tergite and on hypopygium.

Legs, including coxae and trochanters, yellow, with apical half of hind femora blackish, and tibiae, especially hind pair towards tips, sometimes rather tawny; last joint of all tarsi brownish. Front coxae with a few projecting small black spines, including a stronger one at upper outer corner. Front femora with a short yellow bristle or two and a small black spine at base beneath, a short anteroventral row of tiny black points about base, and a posteroventral row of short dark bristles on apical half. Front tibiae with two short rows of tiny black points, anteroventrally about middle and posteroventrally towards tip. (Other legs in case of type too obscured by gum to describe.)

Wings decidedly brownish. Second basal cell ending slightly before middle of wing, and longer than first basal cell by about length of its terminal cross-vein. Cubital and discal veins nearly straight, only gradually and slightly diverging. Halteres yellow, with somewhat dusky knob.

♀. Resembling ♂, but *abdomen* pointed, ending in a pair of short, narrow papillae; abdominal pubescence extremely short and inconspicuous. Front



TEXT-FIG. 2.—*Drapetis savaiensis*, sp. n. Wing of ♂.

legs with less distinctive bristles, coxae with yellowish bristles of which a more brownish basal bristle is the most conspicuous; femora with only 2-3 yellow bristles beneath at base; tibiae apparently simple.

Length perhaps slightly over 1 mm.

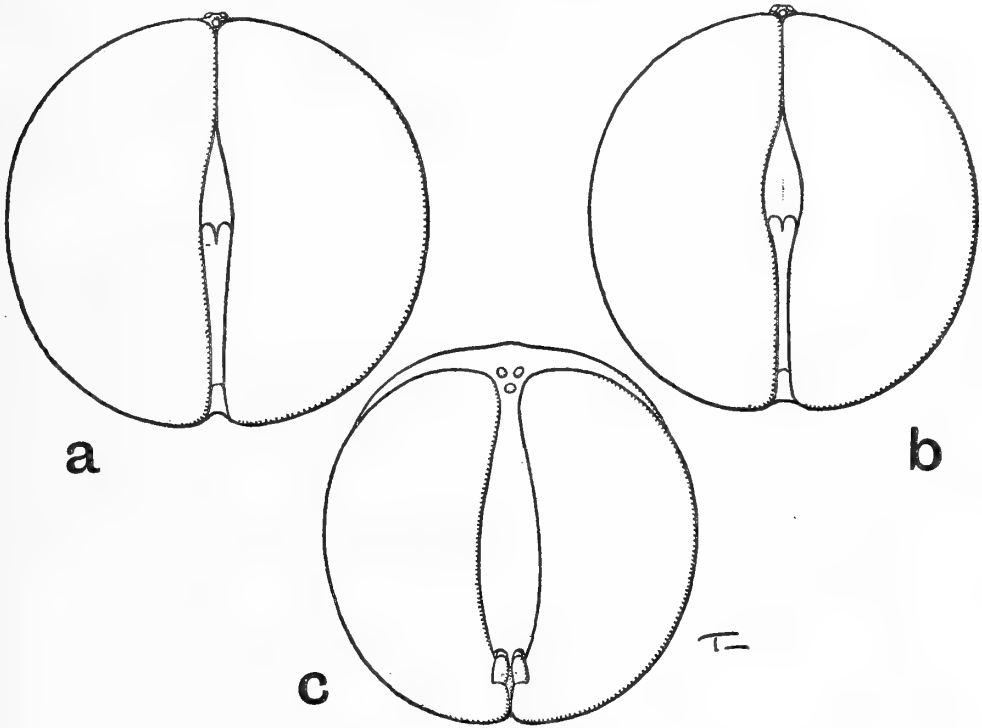
Savaii: Salailua, rain forest, 2,000-4,000 feet, 1 ♂, 1 ♀ (types), 23.v.1924; same locality, 1 ♀ (paratype), 17.v.1924 (Bryan). Type in Bishop Museum, Honolulu.

PIPUNCULIDAE.

In the material brought back from Samoa by Messrs. Buxton and Hopkins, the Pipunculidae are represented by two species of *Pipunculus*. One of these belongs to a small, distinct group, of which species are known to occur in Fiji, North Queensland and possibly Formosa; the other, owing to the bad condition of the single available specimen, and our lack of knowledge of the group characters for all described species outside the Palaearctic Region, cannot be given its correct place among those species and is left without a name.

6. *Pipunculus limitaris*, sp. n. (Text-figs. 3a and 4).

♂. *Frons* and face dusted silvery-grey, former short and narrow, latter very little narrower below antennae, and gradually narrowing below until it is about half width of front of frons (text-fig. 3a). Occiput dusted greyish, less so above. Eye-facets not enlarged in front. Antennae yellow, third joint pale yellow, short and small, with bluntly pointed tip.



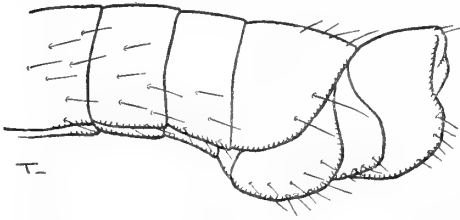
TEXT-FIG. 3.—*Pipunculus limitaris*, sp. n., ♂ (a); *P. vitiensis* Muir, ♂ (b), ♀ (c). Heads viewed from in front.

Thorax shining black, but slightly obscured all over with brownish dust; a vertical band on middle of pleurae has a tendency to yellowish-brown; tiny hairs on dorsum apparently confined to dorsocentral rows, with some slightly longer ones at sides of disc and round scutellar margin.

Abdomen almost parallel-sided (slightly wider towards end), translucently dirty yellowish on first three or four segments, but everywhere, including long fifth segment and large hypopygium, covered like thorax with a thin layer of brownish dust. Two or three yellowish-brown bristles on each basal angle of

first (visible) segment, pubescence otherwise short and pale, becoming a little longer towards tip. Hypopygium slightly inclined towards right, with a very large terminal depression (text-fig. 4).

Legs entirely yellow, hind coxae perhaps a little brownish about base. Tibiae without spurs. Front femora with a few posteroventral, minute black points towards tip, middle femora with similar anteroventral and (more extended) posteroventral points, hind femora with only hairs instead. Only hind femora shining behind.

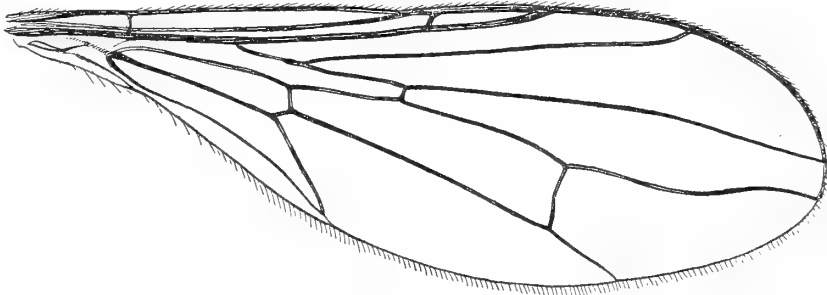


TEXT-FIG. 4.—*Pipunculus limitaris*, sp. n.
Abdomen of ♂, lateral view.

Wings with venation almost exactly as in *P. vitiensis* Muir (text-fig. 5), costal segment between ends of mediastinal and radial veins equal in length to the following segment, stigma not reaching back to end of mediastinal vein, and bounded basally by a distinct cross-vein. End of subapical (or first posterior) cell, perhaps not quite so wide as in *P. vitiensis*. Halteres and squamae yellow.

Length about 2.5 mm.

Samoa: 1 ♂ (type). Tutuila: Afono Trail, 1 ♂ (paratype), 25.ix.1923 (Swezey). Type in Bishop Museum, Honolulu.



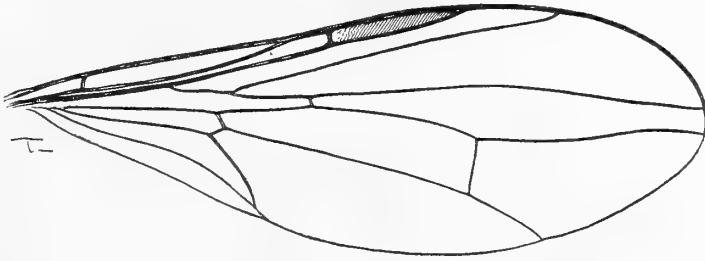
TEXT-FIG. 5.—*Pipunculus vitiensis* Muir (Fiji). Wing of ♂.
The shading of the stigma (cf. text-fig. 6) is accidentally omitted.

P. limitaris is closely allied to *P. heterostigmus* Perkins (North Queensland) and *P. vitiensis* Muir (Fiji). All three species agree in the peculiar venation, especially the abbreviated stigma, bounded basally by a distinct cross-vein, and in having an indistinctly translucent yellow base to the abdomen.

P. heterostigmus has darker legs, "the femora largely darkened above and at the sides" in the female, and only "the trochanters, knee joints and tarsi

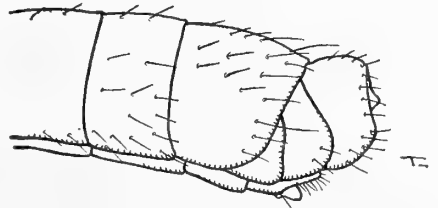
mostly yellowish"; in the ♂ with "the tibiae for some part more brown."* The costal segment between the ends of the mediastinal and radial veins is distinctly longer than the next, as can be seen in text-fig. 6, a drawing made from the type and kindly supplied by Dr. O. H. Swezey.

P. vitiensis, the type ♂ and ♀ of which, through the kindness of Dr. Swezey,



TEXT-FIG. 6.—*Pipunculus heterostigmus* Perkins (N. Queensland). Wing of type.

I have been able to examine, has yellow legs like *P. limitaris*, but the ♂ has a narrower face (text-fig. 3 b); a few of the front facets of the eyes below the antennae are distinctly enlarged even in the ♂, the disc of thorax is more shining, with a tendency for the sides and scutellum to be yellowish, and the hypopygium seen from the side is much smaller (text-fig. 7). The frons of the ♀ (text-fig. 3 c) is very much wider below than above, transversely convex, and shining black except right in front, where it is clothed with greyish dust, the dusting being continued for some considerable distance backwards along the eye margins. The female hypopygium may be somewhat distorted in the type, but the oval basal part is yellowish on its outer side and black on the side nearest the venter, while the yellowish aculeus is as long as this basal part, laterally compressed, slender and gradually tapering, and arises from the basal part with rather a distinct break on the side nearest the abdominal venter.



TEXT-FIG. 7.—*Pipunculus vitiensis* Muir (Fiji). Abdomen of ♂, lateral view.

P. bicolor Becker, a Formosan species described in 1924, probably belongs to this group; it has the abdomen shining yellow and an abbreviated stigma, though no mention is made of a cross-vein at its base.

* Perkins pointed out the possibility that the two sexes may belong to distinct species.

The cross-vein at base of the stigma, which is very distinct in most of the foregoing, may be more or less evident in other species; even the European *P. flavipes* shows some indication of it, while both *P. abdominalis* Lw. (Caffraria), a species with yellowish sides to the abdomen, and *P. semiopacus* Lamb (Seychelle Is.) appear to show an indication of this character in a darkening of the basal margin of stigma. In all these three species, however, the stigma extends back to the end of mediastinal vein, a fact which appears to make the abbreviation of the stigma in *P. heterostigmus* and its allies a character of greater value than the presence of a cross-vein.

In view of my belief that the species of *Pipunculus* may be divided into two groups by the presence or absence of a propleural fan of hairs in front of the lower end of the prothoracic spiracle, it is worth recording that such a fan is present in at least *P. limitaris* and *P. vitiensis*.

7. *Pipunculus*, sp. ?

A single ♂ in bad condition, without antennae, appears to resemble *P. homoeophanes* Perkins, of N. Queensland. The *frons* is dusted at the sides, but shining black about the middle. Thorax black, with disc dusted brownish though still slightly shining, pleurae and metanotum clothed with greyish dust; tiny dorsocentral hairs uniserial, a few longer hairs behind darkened humeri, and very tiny ones on margin of scutellum. Propleural fan present. *Abdomen* much wider in middle than at tip, first segment mainly grey with a single bristle on each upper basal angle, second to fifth segments with dull black basal cross bands, those on second and third segments narrower at sides than in middle where they nearly reach hind margin, those on fourth and fifth segments more even in depth, fourth about two-thirds and fifth one-half depth of segment, rest of middle segments clothed with brownish-grey dust (brownier at sides), hinder half of fifth segment shining black with sides clothed with brownish dust. Hypopygium small, clothed with brownish-grey dust, with a moderate-sized terminal depression. *Legs* (in specimen before me mainly buried in gum with which insect is secured to its mount) apparently dark, with base and tip of at least four posterior tibiae yellowish, and possibly tarsi pale. *Wings* brownish, stigma complete, third costal segment equal to fourth, upper outer corner of discal cell opposite point in costa just beyond end of subcostal vein; middle

cross-vein at rather more than two-fifths of length of discal cell. Halteres pale, with dusky base to stem and extreme tip of knob.

Length very little more than 2 mm.

Savaii : Safune, lower forest, 1,000–2,000 feet, 1 ♂, v.1924 (Bryan).

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,, 7. *Pipunculus vitiensis* Muir (Fiji). Abdomen of type ♂, lateral view.

SYRPHIDAE

BY FRANK M. HULL, Texas State Experiment Station, College
Station, Texas, U.S.A.

(With 2 Text-figures.)

THE insular distribution of Syrphid flies is nowhere of greater interest than in the East Indian and South Pacific regions, and I wish to express my thanks to Mr. P. A. Buxton, through whom I am able to present the following studies of the Samoan Syrphid fauna. An analysis of material from this region is rendered the more interesting in view of the publication of certain dipterological studies of the Fiji islands by the late Dr. Mario Bezzi (*Diptera Brachycera and Athericera of the Fiji Islands*, 1928). The Samoan Syrphids show a marked similarity to that of the Fijian group. Eleven species, belonging to ten genera, were recorded from Fiji, and the present paper lists ten species (one hundred and forty-five specimens), representing nine genera; eight of the Samoan species were found also in Fiji. Moreover, in both archipelagos an unusually high percentage of species fall within the subfamily Syrphinae. It is certainly peculiar that the island regions, Samoa, Fiji, and New Zealand, as far as present records show, should contain markedly high Syrphine components, in contrast to especially low ones in the case of such islands as Sumatra, Borneo, Java and Celebes. The average for the latter region is about 18 per cent., and for the former as high as 66 per cent., with the highest of all represented by 70 per cent. in Samoa. Finally, it may be remarked that Eristalinae and Milesiinae seem to predominate farther to the north-west. The Samoan Syrphids are of Malayan origin, five of the ten species occurring also on the Asiatic mainland.

SYRPHINAE.

1. *Melanostoma univittatum* Wied.

Sixty-two specimens from the following localities:

Upolu: numerous examples from Apia, Afiamalu, Vaea, Vailima, Malolo-

lelei, collected in iii, iv, v, vi, vii, ix, xii (various collectors). Savaii : Safune and Salailua, iv and v.1924 (Bryan). Tutuila : Pago Pago, ix and xii. There is also one ♂ from Tonga (Vavau, Neiafu), 5.iii.1925 (Hopkins).

2. *Asarcina ericetorum* Fabr. var. *oceanica* Bezzi.

Bezzi (*Dipt. Brachycera and Athericera of the Fiji Islands*, p. 71, 1928) describes only the ♂. One can infer that, since the hair on the frons is black, the ground colour is also black. This is the case with all of the present series. The scutellum is mainly black-haired.

Savaii : Salailua, 4 ♀♀, 16-24.v.1924. Tutuila : Pago Pago, 1 ♂, 2 ♀♀, 12-16.iv.1924 (Bryan), and 23.ix.1923 (Swezey and Wilder). Upolu : Apia, 1 ♀, 5.iv.24 (Armstrong) ; Vailima, 1 ♀, 8.vi.1924.

3. *Syrphus corollae* Fabr. var. *vitiensis* Bezzi.

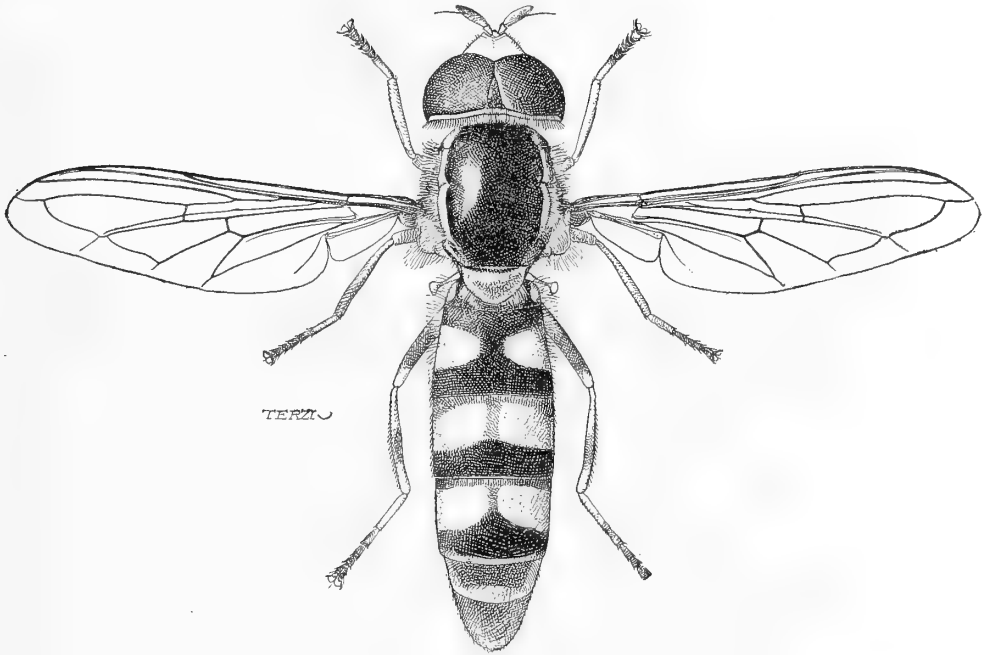
In some cases a small spot continues the yellow thoracic stripe to the scutellar margin. The colour of the abdominal bands is more brownish-orange than yellow.

Tutuila : Fagasa, 4 ♂♂, 1 ♀, 9.ix.1923 (Swezey and Wilder). Upolu : Apia, Aleipata, 1 ♂, 2 ♀♀, iv. and v.1924, 1925 (Buxton and Hopkins). Savaii : Safune, lowlands to 1,000 feet, 1 ♂, 1.v.1924 (Bryan). There is also one ♀ from Tonga, Vavau (Haloga), 23.ii.1925 (Hopkins).

4. *Ischiodon scutellaris* Fabr. (Text-fig. 1).

Three ♂♂, five ♀♀. The males agree quite well with typical specimens. Bezzi (*op. cit.* p. 73) states that the anterior eye facets are not enlarged in this species, but in the males from Samoa, the facets are very distinctly enlarged in the region to the side and just above the base of the antennae. Brunetti (*Fauna of British India*, vol. 3, p. 97, 1923) likewise finds the anterior facets enlarged. The anterior tarsi are not blackened at the tips but reddish in colour. In two of the three males the genitalia, though strongly developed and visible above, are shining black, but in the third they are reddish. The spine on the trochanters is stout. The five females vary considerably. The dark area of the scutellum is much deeper and more distinct, and the abdominal bands on

the third and fourth segments are quite narrow, either interrupted or nearly so, and do not approach the anterior margin. In one specimen, however, the yellow bands on the third and fourth segments are contiguous as described for typical examples, but the fifth segment has, instead of a black transverse band, an obscure brownish spot on either side. Most of the females have the fifth



TEXT-FIG. 1.—*Ischiodon scutellaris* Fabr. ♂.

segment wholly shining black, with narrow posterior margins and small anterior corners obscurely shining brownish.

Upolu: Malololelei, 3 ♀♀, 19.iv, 21–25.vi.1924 (Armstrong). Tutuila, 2 ♂♂, 25–30.ix.1923 (Swezey and Wilder). There are also 1 ♂, 2 ♀♀, from Tonga (Vavau, Haloga), 9.iii.1925 (Hopkins).

5. *Xanthogramma javanum* Wied.

Three ♀♀ from Tutuila, Savaii, and Upolu. Owing to the black-haired scutellum and the reversed coloration of the hind tibiae, this species is readily distinguishable from *Ischiodon scutellaris* Fabr. The third joint of the antennae is about as broad as long, rounded at the tip, and brownish-orange in colour,

smoky on the dorsal half. In the specimens from Tutuila and Savaii the ground colour of the scutellum is clear opaque yellow.

Tutuila : Pago Pago, 1 ♀, 14.xii.1925 (Buxton and Hopkins). Upolu, 1 ♀, 7.vii.1925 (Wilder). Savaii : Safune, 1 ♀, 5.v.1924 (Bryan).

6. *Xanthogramma amphoterum* Bezzi.

Bezzi's series of specimens of this species came from Movua and Lautoka, Fiji, and from Rarotonga. The present collection includes a male and female which show several noteworthy differences from the type.

♂. Shining black borders to third and fourth abdominal segments quite narrow, posterior borders about five times as broad as anterior, on the anterior margins of these segments the shining portion limited to a very narrow band.

♀. In this specimen the velvety black bands on the third and fourth abdominal segments are broader than in the male; in the type, according to Bezzi, the reverse is the case. There is no trace of the anterior shining band. Moreover, the yellow transverse bands on these segments, instead of being entire, are widely interrupted and broken up into spots. The individual before me may represent a distinct species. However, in its ensemble of characters, *X. amphoterum* is supposed to be intermediate between *Ischiodon scutellaris* Fabr. and *Xanthogramma javanum* Wied. var. *distinctum* Kertész. In default of a series of the forms involved, anything in the shape of a definite conclusion is impossible. Other slight departures from the type are as follows: the antennal prominence is clothed with yellow instead of black hair; the sides of the face are not whitish but sulphur yellow, and their pile is pale; the third antennal joint in the male is rather light yellow and as long as broad, with its tip somewhat truncated.

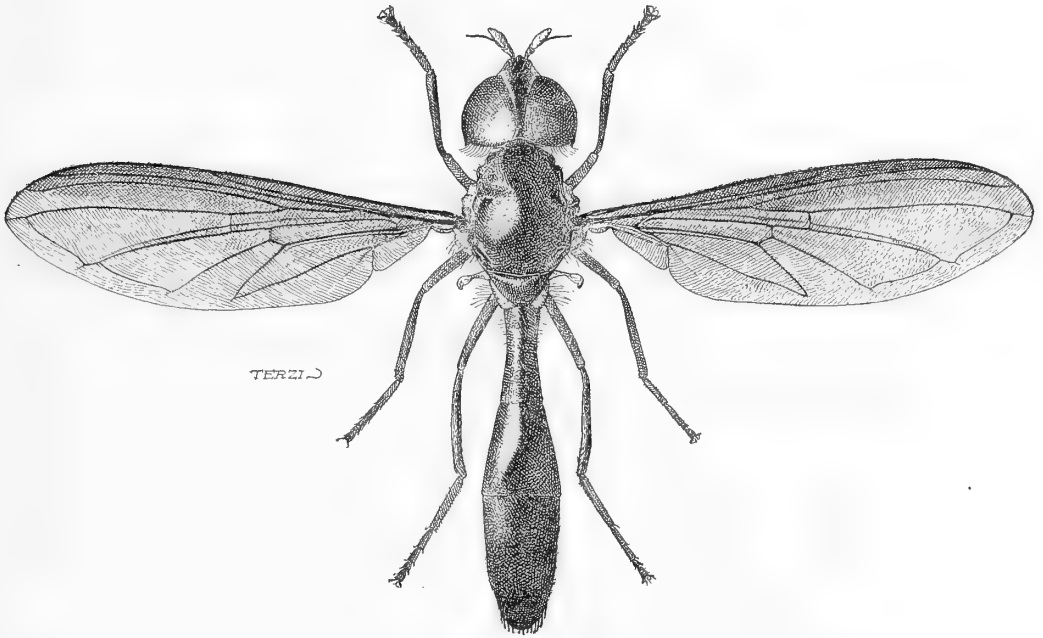
Tutuila : Pago Pago, 1 ♂, 18.iv.1924. Savaii : Safune, lowlands to 1,000 feet, 1 ♀, 4.v.1924 (Bryan).

7. *Baccha praeifica* Bezzi (Text-fig. 2).

The present collection includes a number of examples of this interesting species, which was described by its author (*op. cit.*, p. 76, 1928) from the female alone. I therefore give a description of the male below. The female specimens show slight differences from the Fijian material. The short hairs on the front

(frons) and sides of the face are pale instead of dark. The second and third abdominal tergites especially have a purplish lustre mingled with the blue; this likewise shows faintly on the dorsum of the thorax. The scanty blackish-brown dust on the thorax is disposed in such a way that anteriorly three very narrow shining stripes may be seen in some lights. So strong is the metallic coloration, however, that these are not visible in every specimen.

♂. Vertical triangle very acute, wedge shaped, about four times as long as



TEXT-FIG. 2.—*Baccha praeifica* Bezzi. ♀.

wide, with a longitudinal crease or impression anteriorly, and the short black bristles set in a row arranged antero-posteriorly. Front with long, stiff, shining black, bristly hairs. Upper anterior eye facets barely perceptibly enlarged. Second joint of antenna showing same inner protuberance as in ♀. Hypopygium small and shining black, not visible from above.

Upolu : Malololelei, 9 ♀♀, 20.iii.–14–30.vi., 7.vii.1924 (Armstrong, Buxton and Hopkins). Savaii : Safune and Salailua, 1 ♂, 3 ♀♀, 21, 22.v.1924. Tutuila : Pago Pago, 4 ♂♂ (cotypes), 1 ♀, 16–18.iv.1924 (Bryan), 14.xii.1925.

VOLUCELLINAE.

8. *Volucella obesa* Fabr.*

Upolu, 5 ♂♂, 9 ♀♀, 15.iii-vi., xii.1925. Tutuila, 1 ♂, 18.iv.1924 (Bryan).

ERISTALINAE.

9. *Dissoptera maritima* sp. n.

Four males of this peculiar fly included in the present collection present important differences from *D. unicolor* Bezzi, to which, owing to its general dark coloration, the species would appear to be related. The antennae are black, not reddish, and the arista, which is scarcely longer than the entire antenna, is very strongly thickened on its basal half or two-thirds. The yellowish scaly tomentum is not at all apparent, although some short yellowish hair is present beneath the longer black vestiture. The halteres are yellowish, and the male genitalia slightly visible from above. There are some long pale hairs on the hind femora, especially about the tips, as well as the denser, stiff, semi-appressed black bristle-like hairs. The wing-veins are brownish, and the costa ends approximately at the tip of wing. Bezzi states that the eyes of *D. unicolor* are unicolorous, but in all four specimens before me I can observe well-defined, small, point-like spots or reflections, suggesting the appearance afforded by certain females of *Lathyrrophthalmus*.

♂. *Eyes* bare, separated widely, as described for *D. unicolor*, narrowest in profile on lower half; distance between eyes at lower part of front but slightly

* This species frequented earth closets, and was observed to deposit its eggs on the under side of the seat.—P. A. BUXTON.

Possibly owing to the agency of old-time sailing ships, to which it may have been attracted by odours, *Volucella obesa* has a wide distribution in the tropics, where it occurs in both hemispheres. As shown by the series of specimens in the British Museum, apart from Samoa the fly is found at any rate in Mexico, Central and South America, the West Indies, the Sandwich Is., Tahiti, Rodriguez I., Mauritius, the Seychelles Is., Madagascar and N. Nigeria (the National Collection includes a solitary specimen from Kano). On the Lower Amazons, Brazil, thirty-odd years ago, it was "very common everywhere," and its association with privies was also noted. "Like the Bee (*Chrysantheda nitida*), which it closely resembles when on the wing, this fly is the victim of an overpowering curiosity, and remains poised in the air in front of one in a way that is perfectly irritating. It seems to be an exceedingly stupid fly, and when caught in the net its movements at once become dull and sluggish" (cf. Austen, *Proc. Zool. Soc. Lond.* 1896, p. 776).

—E. E. AUSTEN.

greater than at vertex. Front just before antennal prominence shining black, bare; remainder of front and vertex shining metallic bluish, largely obscured by brownish-black dust; front and vertex completely covered with rather thick, long, shaggy, black hair, extending to upper occiput; behind black hair a narrow band of whitish hair of similar length. Upper occiput very prominent, so that corners of eyes are cut away posteriorly; middle of occiput devoid of long hair, with microscopic whitish pubescence and whitish pollen, and with a few longer white hairs below. First and second joints of antennae shining black, third joint opaque black, rounded, slightly deeper than long. Arista black, bare, much thickened on basal half. Face depressed immediately below antennae, otherwise strongly projecting; shining black, covered along eye margins, narrowly opposite side of antennae, more widely below to middle of cheeks, with dense white band of microscopic pubescence, connected just below antennae. Shining black middle of face with a few longer black hairs, sides sparsely clothed with long white hairs.

Dorsum of thorax shining black, narrowly opaque anteriorly, and clothed with thick, long, greyish hair, which becomes black in middle and posteriorly. Scutellum black, shining, clothed with very long, black hair. Pleurae grey, feebly shining, with middle covered with dense tufts of long, greyish-white pile. Halteres light yellowish.

Abdomen shining black, with nearly parallel sides, third and fourth segments being only slightly narrower than second, and with their sides very strongly incurved. Dorsum clothed with rather long, thick hair, becoming shorter posteriorly, whitish on second and third segments anteriorly, forming a black band posteriorly; fourth tergite with entirely black, appressed, stiffish hair. Genitalia shining black, short, black haired, and barely visible from above.

Legs slender, shining black (except tarsi, which are dark brown), clothed for most part with black hair; a few whitish hairs on anterior tibiae posteriorly, and both long, sparse, white hairs and microscopic whitish pubescence on hind femora; first joint of hind tarsi slightly thickened.

Wings hyaline; stigma and veins light brown, costa ending a little before tip of wing.

Upolu: Malololelei, 1 ♂ (holotype), 2.vii.1924 (Armstrong), 1 ♂ (paratype), 18.vi.1924 (Buxton and Hopkins). Tutuila: Pago Pago, 2 ♂♂ (paratypes), 18.iv.1924 (Bryan), 14.xii.1925.

10. *Lathyrophthalmus nitidus* Van der Wulp.

The Samoan variety of this striking species agrees in detail with Bezzi's description of Fijian specimens (*op. cit.*, pp. 79-80, 1928), except that the anterior border of the second abdominal segment in the female is interrupted in only one instance; the median interruption of the bands on the following segments is quite characteristic.

Upolu: Malololelei, 1 ♂, 8 ♀♀, 20-26.vi.1924 (Armstrong), 7.vii.1925 (Wilder). Tutuila: Pago Pago, 1 ♀, 9.ix.1925 (Swezey and Wilder). Savaii: Safune, 1 ♂, 16.v.1924 (Bryan).

LIST OF TEXT-FIGURES.

Text-fig. 1. *Ischiodon scutellaris* Fabr. ♂.
„ 2. *Baccha praefica* Bezzi. ♀.

CLUSIIDAE (HETERONEURIDAE) AND SAPROMYZIDAE

By J. R. MALLOCH, Bureau of Biological Survey, Washington, D.C., U.S.A.

(With 6 Text-figures.)

CLUSIIDAE.

In 1925 Melander and Argo (*Proc. U.S. Nat. Mus.*, Vol. 64, Art. 11, pp. 1-54, Pls. 1-4, 1925) published a revision of this family, and included in their paper keys to all the recognized genera and species of the world. They recorded the fact that no species had then "been described from Africa, Australia, or Asia," while only four of the eighty known species "have been recorded from the islands south of Asia." Since the appearance of that paper I have described an Australian species, and more recently Bezzi (*Diptera Brachycera and Athericera of the Fiji Islands*, p. 87, 1928) described one from a solitary specimen from Fiji. Both of these species belong to the genus *Heteromeringia* Czerny, which was previously known to be represented in North and South America, and in Europe. In the Samoan material I find examples of two species which are not referable to any known genus, and are therefore described below.

The species of which the life-histories are known live in the larval and pupal stages in dead wood, some of them under the bark of recently felled trees, others in rotten portions of growing trees, and still others in much decayed, spongy areas in dead tree-stumps or logs. Usually the flies may be found on the trunks of trees suitable for their oviposition and especially on fallen timber, but unless searched for in such situations they are seldom met with, and thus are much rarer in collections than is the case with some other families which are more promiscuous in their flight habits. Neither in their immature nor mature stages are the species of economic importance to man.

Isoclusia, gen. n.

This genus has two pairs of reclinate orbital bristles, no cruciate interfrontals, ocellars and postverticals present, equal in length, and shorter than

anterior orbitals; arista very short haired; vibrissae single, situated behind anterior line of eyes, and very widely separated; thorax with 1-2 pairs of dorsocentrals, four scutellars, one mesopleural and one sternopleural; all tibiae with a preapical dorsal bristle, very short and fine on hind pair; first wing-vein bare; ultimate section of fourth vein about five times as long as penultimate section.

In the key given by Melander and Argo (*loc. cit.*, p. 4) this genus cannot be carried further than (2), since it can be placed in neither of the groups segregated by the characters listed, one having reclinate orbitals and cruciate interfrontals, and the other having either proclinate or convergent anterior orbitals.

Genotype, *Isoclusia samoensis*, sp. n.

1. *Isoclusia samoensis*, sp. n.

♀. Shining tawny yellow, face whitish-yellow, with white dust; frons brownish, orbits narrowly margined with whitish dust; antennae and palpi testaceous yellow; legs entirely yellow; wings hyaline, with a fuscous cloud at tip from apex of second vein, evanescent posteriorly.

Frons dull, subquadrate, interfrontalia bare, anterior orbital with a very slight curve at apex, about half as long as posterior orbital; eyes almost round, bare; third antennal segment about 1.5 as long as wide, rounded at apex; arista slender, about 1.5 as long as width of anterior margin of frons; cheek about as high as width of third antennal segment; face slightly convex. *Thorax* with four series of intradorsocentral hairs, presutural bristle well developed, and no distinct prescutellar acrostichals; scutellar bristles subequal, disc bare. *Legs* normal, front femur with a series of posteroventral bristles, becoming longer apically. Outer cross-vein of *wing* at over 1.5 its own length from apex of fifth vein; ultimate section of fourth vein about five times as long as penultimate section, not noticeably curved forward apically.

Length, 3 mm.

Savaii: Safune, type and paratype ♀, 13.v.1924 (Bryan). Type in the Bishop Museum, Honolulu.

2. *Isoclusia hyalipennis*, sp. n.

♂. Very similar in all respects to the foregoing species, and agreeing in colour and general structure, but with no trace of an apical dark mark on the

wings. Upper surface of fore tarsi with erect, curled, black hairs, distinctly longer than diameter of segments upon which they are situated; outer cross-vein in wing about half its own length from inner one.

Length, 3 mm.

Upolu: Afiamalu, type ♂, 7.xi.1925 (Wilder). This specimen is in the Bishop Museum, Honolulu.

Even allowing for the contingency of sexual dimorphism, it would appear impossible that the forms described above are the male and female of the same species, the cases where wing-markings are absent in one sex and present in the other being normally the reverse of that exhibited here. More material, in much better condition, is, however, required before a definite decision can be made.

SAPROMYZIDAE.

In the work to which reference has already been made, Dr. Bezzi did not attempt to place the Fijian species in their proper genera, as distinguished in the recent papers by Dr. F. Hendel and myself; and without access to his species it is impossible to decide the exact status of all of them. It is, however, evident from Bezzi's statement that all of the species placed by him in *Sapromyza* have the small black setulae on the costal vein extending to the end of third vein, that all are referable to the genus *Homoneura* van der Wulp *sens. lat.* Whether the species belong to several subgenera can only be determined by an examination of the type specimens, but it appears probable that *Sapromyza acrotoxa* Bezzi is a *Griphoneuroides*. *Griphoneura insignis* Bezzi is very probably referable to the same subgenus of *Homoneura*, since no true species of *Griphoneura* is yet known to occur in the Orient.

The peculiar Fijian genus *Encyclosis* Bezzi is not represented among the Samoan material before me.

Bezzi was in error in placing three Fijian species in *Drosomyia* de Meijere. The species in question belong to *Trypaneoides* Tonnoir and Malloch, a genus found in Asia, and extending southward to New Zealand. I have examined the genotype of *Drosomyia*, and find that it lacks the discal bristle on the mesopleura which characterizes *Trypaneoides*.

Trypaneoides Tonnoir and Malloch.

In a recently published revision of the Oriental Sapromyzidae,* I have dealt with the species of this genus, with the exception of one which occurs in Australia, and another which is found in New Zealand. None of the three Fijian species assigned by Bezzi to *Drosomyia* agree with any of those in my key. All three of them run to No. 7 in that key, and all have but one clear spot on the costa between the ends of the second and third veins, being thus distinguished from *T. hyalipuncta* Malloch. In *Sapromyza leucostica* Bezzi there is but one spot, or two connected spots, in the apex of the first posterior cell, a character which readily distinguishes this species from all the others, in which there are eight or more such spots in that cell; in *S. cirrhicauda* Bezzi there are about twelve clear spots in the first posterior cell, owing to those in the apical half of the cell being divided by a dark line; and in *S. caniventris* Bezzi the spots in the same cell are all more or less connected by pale lines extending between them on the central line of the cell.

In the material from Samoa I find examples of one of the species described by Bezzi, and of two others which are distinct from his. Below I present a key for their differentiation.

KEY TO THE SPECIES.

1. Face densely covered with pale grey, with two complete, rather broad, dark brown transverse bands, one a little above lower margin, the other below bases of antennae; longest hairs on arista about five times as long as its basal diameter; cheek without a dark mark near vibrissal angle; ultimate section of fourth wing vein very distinctly less than twice as long as penultimate section; large species, averaging over 4 mm. in length *caniventris* Bezzi.
- Face covered with grey dust, with at most a narrow, dark, transverse band near lower margin, sometimes reduced to three dark spots, one on each side, the other in centre; hairs on arista not, or very slightly, longer than its basal diameter; ultimate section of fourth vein twice as long as penultimate section; smaller species, not over 3 mm. in length 2

* Cf. Malloch, J. R., "Notes on Some Oriental Sapromyzid Flies (Diptera), with Particular Reference to the Philippine Species": No. 2751, *Proc. U.S. Nat. Mus.*, Vol. 74, Art. 6, pp. 1-97, Pls. 1-6, 1929.

2. Cheek without a dark spot near vibrissal angle ; three clear spots and a central longitudinal streak in submarginal cell of wing (between apical sections of veins 2 and 3) ; Fijian species *leucosticta* Bezzi.
 Cheek with a black-brown spot near vibrissal angle ; submarginal cell of wing with clear spots, with or without longitudinal central streak 3
3. Only three clear spots in submarginal cell of wing ; no clear spot on each side of inner cross-vein ; ground colour dark brown *samoensis*, sp. n.
 More than three clear spots in submarginal cell of wing, the additional spots rather small and faint ; a clear spot on each side of inner cross-vein *puncticeps*, sp. n.

3. *Trypaneoides caniventris* Bezzi.

This species, besides its larger size and the distinctions mentioned in the above key, has the frons more protuberant in front, and two or more outstanding discal bristles on the mesopleura.

Length, 4-6 mm.

Upolu : Apia, 31.v.1924 ; Vailima, 9.vi.1924. Tutuila : Pago Pago, 4.xi.1925 (Buxton and Hopkins) ; and Leone Road, 19.ii.1924 (Bryan). Manua : Tau, 20.ii.1926 (Judd). Tonga Islands : Vavau, Neiafu, 5.iii.1925 ; Nukualofa, 22.ii.1925 (Hopkins).

Judging from its occurrence in these three groups of islands, this species would appear to be the most widely distributed of those found in this region, but it may be that its larger size is responsible for its more frequent inclusion in collections.

3A. *Trypaneoides leucosticta* (Bezzi).

I accept as belonging to this species one specimen before me, despite certain differences between it and Bezzi's description and figure. It is possible that the faint longitudinal streaks in the marginal, submarginal, and first posterior cells of the wing in my specimen are evident because the example is rather teneral, since they do not show in Bezzi's figure. There is a marked distinction between the specimen before me and Bezzi's description, the former having the abdomen pitchy black, with two round white pollinose spots on each side of each tergite except the basal one, situated about midway between the fore and hind margins, and a smaller white pollinose spot in the middle of the hind margin. Bezzi, on the other hand, describes the species as having the paired spots on the hind margin, and the central one on the fore margin. Unless we have examined

different species, I can only assume that there is an error in Bezzi's description reversing the position of the white spots.*

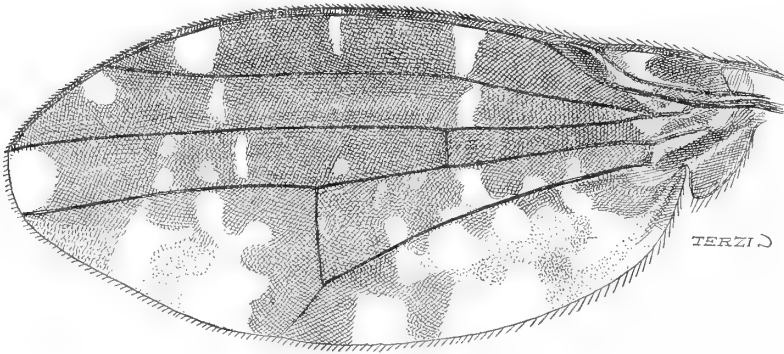
Length, 3 mm.

Fiji Islands: Viti Levu, Colo-i-Suva, 20.vi.1924 (Bryan).

This species, which is not known to occur in Samoa, is included here because of the above-mentioned points of variance with the original description and figure. It has not been previously recorded from this locality in Fiji.

4. *Trypaneoides samoensis*, sp. n. (Text-fig. 1).

♂. Black, densely clothed with brownish-grey dust. *Interfrontalia* fuscous; face with three small, dark brown, almost connected marks in depression above



TEXT-FIG. 1.—*Trypaneoides samoensis*, sp. n. Wing.

lower margin, and a similarly coloured mark between antenna and eye; a black-brown mark on each cheek near vibrissal angle; antennae brownish-yellow, third segment black except upper basal angle; aristae and palpi fuscous.

* A careful comparison of the example from Colo-i-Suva, Viti Levu, Fiji, here discussed by Mr. Malloch, with the type ♂ and ♀ of *Sapromyza leucosticta* Bezzi, shows conclusively that the three specimens are conspecific. In all three the colour of the abdomen is the same (dark mummy-brown); the paired spots are not on the hind margins of their respective tergites, but are nearer to the hind than to the fore margins; and the small median spot on the fore margin of the third and fourth tergites in the case of the ♂ type, and at least on that of the third tergite in the specimen examined by Mr. Malloch, extends on to the hind margin of the preceding tergite. As regards the wings, the pale longitudinal streaks which, as stated by Mr. Malloch, are present in the dark areas in the marginal, submarginal and first posterior cells in the case of the specimen from Colo-i-Suva, would appear to be due to individual variation, if not to immaturity as Mr. Malloch suggests. As a matter of fact, the distal portion of the first posterior cell in the case of Bezzi's ♂ type shows a trace of such a streak, which is more evident in the left wing than in the right.—E. E. AUSTEN.

Thorax with four pairs of acrostichals and dorsocentrals; mesopleura with one strong discal bristle. Mesonotum with following dark brown marks: a pair of vittae between acrostichals and dorsocentrals, broken at third pair of dorsocentrals, and widened behind to enclose prescutellar acrostichals; a pair of interrupted vittae between dorsocentrals and lateral margin, and a large spot at base of each bristle; pleurae largely spotted with dark brown; scutellum without dark spots. *Abdomen* with numerous small and moderately large spots of pale dust on dark brown ground, each hair and bristle inserted in one of the pale spots, largest of latter in a series near posterior margin, and one in centre of anterior margin, of each tergite. *Legs* testaceous yellow, with dark bases to femora, a dark mark near tip of each femur, and one near base of each middle and hind tibia. *Wings* as shown in text-fig. 1. Ultimate section of fourth vein twice as long as penultimate. *Halteres* dark brown.

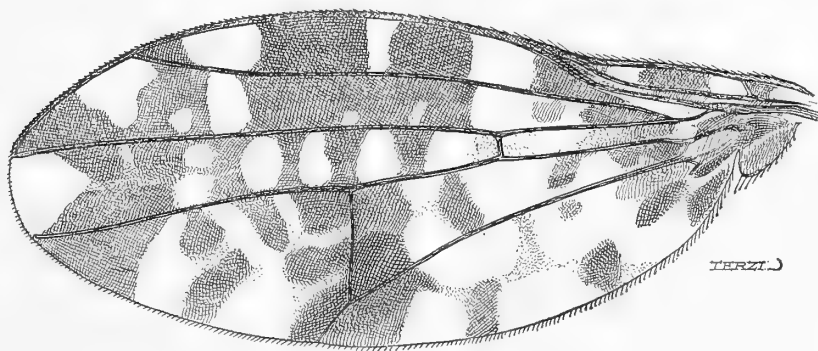
Length, 3 mm.

Tutuila: Pago Pago, 1 ♂ (type), 14.xii.1926 (Buxton and Hopkins).

In all three of the small species the halteres are dark, in *T. caniventris* they are yellow.

5. *Trypaneoides puncticeps*, sp. n. (Text-fig. 2).

♂♀. A darker coloured species than the foregoing, with which it agrees in structure and size. The covering of dust on the head and thorax is leaden



TEXT-FIG. 2—*Trypaneoides puncticeps*, sp. n. Wing.

grey, that on the abdomen yellowish-grey. The *face* has the lower dark mark forming a complete band, and the *thoracic dorsum* has the submedian vittae much broader and complete, connecting, or almost connecting, with two dark

stripes on the scutellum. *Legs* as in *T. samoensis*, but the femora are fuscous except at the tips. *Wings* as shown in text-fig. 2.

Upolu: Tuaefu, type ♂ and allotype, 16.ix.1923 (Swezey and Wilder). Type in the Bishop Museum.

Homoneura van der Wulp.

This is the predominant genus of the family in the Malayan region, and apparently in Oceania also if one may judge from the material already described. In Australia *Sapromyza* Fallen is the richest in species; although many of the forms are rather aberrant, it is not possible to distinguish them generically in a satisfactory manner at this time. I have erected several subgenera of *Homoneura* in the paper referred to above, and two of the segregates named therein are represented in the Samoan material before me.

Bezzi has described three Fijian species, which belong to a group in which but one sternopleural and no intra-alar bristle is present, the anterior one of the three pairs of dorsocentrals is presutural, and the mesonotum is metallic bluish or greenish. This group is unrepresented in the Samoan material now before me. All the other Fijian species included in Bezzi's key after the foregoing three are said to have a distinct intra-alar bristle, and would therefore be assignable to the subgenus *Minettioides* Malloch, but none of them agrees with any one of the species of this subgenus dealt with below.

I have before me a male and female from Fiji (Viti Levu), which appear to belong to *H. ensifera* Bezzi, but they are teneral and it is impossible to be certain as to this. The female possesses a knife-like ovipositor, and in other respects the species agrees very well with the description except that the specimens are darker than described. The particular point, however, that I desire to mention is that the specimens do not possess a well-developed intra-alar bristle as required by Bezzi's key, and it is possible that an error has crept in here. Since the species is not Samoan, I do not care to deal further with it here.

It must be noted that Bezzi, in considering the length of the hairs on the arista, takes the total extent from the tips of the hairs on the lower side to the tips of those on the upper side, thus making any estimate he gives twice as great as that given by me, since I consider only the length of the individual hairs.

I present below a key to the Samoan species, only two of which fall within any of the segregates in Bezzi's key.

KEY TO SPECIES.

1. A small but distinct intra-alar bristle on mesonotum (Subgenus *Minettioides* Malloch) 2
 No distinguishable intra-alar bristle (Subgenus *Homoneura* van der Wulp) 4
2. Abdomen with two series of deep black, round spots, one pair on each tergite from second, or third, to sixth inclusive; ♂ hypopygium yellow 3
 Abdomen with three series of black, more or less angular spots, lateral spots connected with a black hind marginal fascia which extends to, or almost to, extreme lateral margin of tergites 3 to 6 inclusive, spots sometimes enlarged to form three broad black vittae; hypopygium of ♂ black or fuscous *nigricauda*, sp. n.
3. Fore femur without a series of stiff black spinules on apical half of antero-ventral surface *apiseriata*, sp. n.
 Fore femur with a series of stiff black spinules on apical half of anteroventral surface *setulosa*, sp. n.
4. No well-developed acrostichal bristles in front of prescutellar pair; thorax largely grey *hawaiiensis* Malloch.
 One or more pairs of well-developed acrostichal bristles in front of prescutellar pair 5
5. Shining black species, anterior margin of frons reddish, abdomen glossy black; halteres with fuscous knobs *anthracina*, sp. n.
 Shining yellow species, only black markings consisting of some black spots on apical half of dorsum of abdomen, usually three on fifth and two on sixth tergite, with more rarely three much fainter ones on fourth; halteres yellow *acrostichalis* de Meijere.

6. *Homoneura acrostichalis* de Meijere.

This species is readily distinguishable from its allies by the presence of a fringe of closely placed, small black setulae along the sides of the sixth abdominal tergite, on the extreme edge, in the ♂. The fore femur has the usual series of very small black spines on the apical half of the anteroventral surface, a character which distinguishes the species in both sexes from others of similar general appearance occurring in the same region, several of these lacking the series which is normally present in this genus throughout the Orient.

Tutuila: Amauli, 9.vi.1923 (Swezey and Wilder); Pago Pago, 18.iv. (Kellers). Upolu: Apia, 27.v.1924 (Bryan). Manua: Tau, 20.v.1926 (Judd).

H. acrostichalis also occurs in the Dutch Indies, and Formosa.

7. *Homoneura* (*Homoneura*) *hawaiiensis* Malloch.

Distinguishable at once from any other species represented in the collection before me owing to the thorax being densely covered with grey dust. As its name implies, the present species was originally described from material from Hawaii, where, so far as my existing knowledge goes, there is only one other representative of the genus.

Tutuila : Pago Pago, 14.xii.1925. Upolu : Apia, 18.ii.1924 (Buxton and Hopkins), and 27.v.1924 (Bryan). Savaii : Safune, 5.v.1924 (Bryan). Manua : Tau, 20.ii.1926 (Judd).

I have seen examples of this species from no other localities than Samoa and Hawaii.

8. *Homoneura* (*Homoneura*) *anthracina*, sp. n. (Text-fig. 3).

♂♀. Glossy black ; anterior margin of frons, and usually most of face and cheeks, antennae, trochanters, tibiae, and tarsi, testaceous yellow ; palpi, antennae, and face, sometimes brown or fuscous. Wings greyish-hyaline, not blackened at bases. Calyptrae and knobs of halteres fuscous.

Frons parallel-sided, a little longer than wide, orbital stripes slightly differentiated, orbital bristles moderately strong, anterior pair a little shorter than posterior pair, ocellars and postverticals shorter than anterior orbitals, subequal, outer verticals over half as long as inner pair ; longest hairs on arista about equal in length to its basal diameter ; third antennal segment over 1.5 as long as wide ; face shining. *Thorax* with usual three pairs of postsutural dorsocentral bristles ; intradorsocentral hairs in about ten series, and at least one pair of outstanding acrostichal bristles about midway between suture and hind pair ; sternopleurals 2. *Abdomen* ovate ; male hypopygium as in text-fig. 2. Fore femur with series of short setulae on apical half of anteroventral surface quite well developed ; middle tibia without posterior bristles ; hind femur without an anteroventral preapical bristle ; preapical dorsal bristle present on all tibiae. Inner cross-vein of *wing* slightly proximad of middle of discal cell ; penultimate section of fourth vein fully two-thirds as long as ultimate section.

Length, 3.5–4.5 mm.

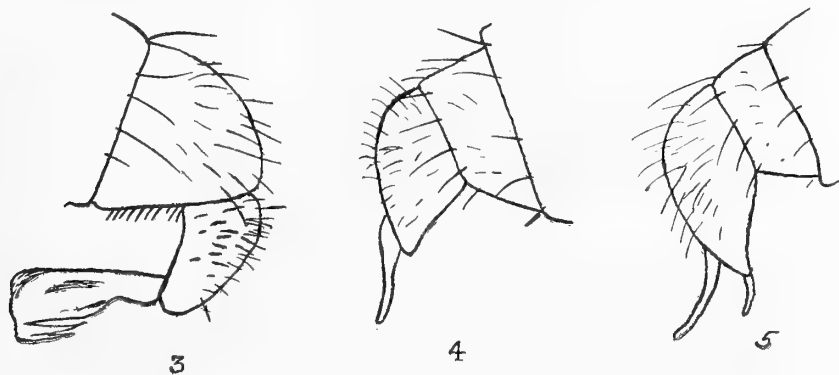
Tutuila : Pago Pago, type ♂, allotype, and 3 paratype ♀, 14.xii., 1925 (Buxton

and Hopkins); paratype ♀, and 1 paratype pair *in copulâ*, same locality, 25.ix.1923 and 24.ix.1923 respectively (Swezey and Wilder).

In Tahiti there is a somewhat larger species, very closely related to this but distinguished by structural differences. It is still undescribed, but I hope very shortly to include it in a report on material from that region.

9. *Homoneura* (*Minettioides*) *nigricauda*, sp. n. (Text-fig. 4).

This and the two following species are very similar in colour and general habitus. A description of the present species will suffice for the others, of which only distinguishing characters will be mentioned.



TEXT-FIG. 3.—*Homoneura anthracina*, sp. n. ♂ hypopygium.

TEXT-FIG. 4.—*Homoneura nigricauda*, " " " "

TEXT-FIG. 5.—*Homoneura apiseriata*, " " " "

♂. Shining orange-yellow. *Frons* as in *H. anthracina*, dull, slightly darker in the centre; longest hairs on arista about three times as long as its basal diameter. *Thorax* as in *H. anthracina*, but with about eight series of intra-dorsocentral hairs, and no well-developed acrostichals except prescutellar pair. *Abdomen* with three series of black, more or less triangular marks, varying much in intensity and development, central series sometimes indistinct and lateral ones and apical fascia much reduced; in darker examples black markings forming three broad, complete vittae from near base to apex of abdomen. Hypopygium as in text-fig. 4, generally black or fuscous, rarely yellow in part. *Legs* yellow; fore femur with preapical anteroventral series of setulae very fine and hair-like, almost undeveloped; all tibiae with preapical dorsal bristle. *Wings* as in *H. anthracina*, yellowish hyaline. *Halteres* yellow.

Length, 5 mm.

Savaii: Safune, type and 4 paratypes, 17-23.v.1924 (Bryan). Tutuila: Afono Trail, 1 paratype, 25.ix.1923 (Swezey and Wilder). Type in Bishop Museum, Honolulu.

An example with yellow hypopygium and no central black spots on the abdomen appears to represent a pale form of this species. The specimen shows the lateral apical fascia extending from the sublateral spot to the lateral extremity of the tergites of the apical half of the abdomen, a character which distinguishes it from the next two species.

Tutuila: Pago Pago, 19.iv.1924 (Bryan). The specimen is in the Bishop Museum.

10. *Homoneura* (*Minettioides*) *apiseriata*, sp. n. (Text-fig. 5).

♂♀. Similar to *H. (M.) nigricauda*, and differing only in having a pair of round black spots on each tergite from third to sixth inclusive, and in the outer arms of the hypopygium having a more decided projection at the apex (*cf.* text-fig. 5).

Length, 5 mm.

Upolu: Tuaeфу, Sliding Rock, type ♂, allotype, 1 paratype ♂ and 1 paratype ♀, 16.ix.1923 (Swezey and Wilder). Type in Bishop Museum.

In the case of the two paratypes there is a slight indication of a darkened central spot on the anterior margin of some of the tergites of the apical half of the abdomen.

11. *Homoneura* (*Minettioides*) *setulosa*, sp. n.

♀. Slightly paler in colour than species 9 and 10, with the round, black, paired spots on the abdomen beginning on the second visible tergite, and the fore femur with a distinct comb-like series of minute black spines on the apical half of the anteroventral surface. In other respects as *H. (M.) apiseriata*.

Length, 5 mm.

Manua: Tau, type, 20.ii.1926 (Judd). In the Bishop Museum, Honolulu.

Panurgopsis Kertész.

I consider *Prochaetops Bezzi* (*Diptera Brachycera and Athericera of the Fiji Islands*, p. 120, 1928) identical with this genus. Bezzi states that his genus is

distinguished from *Panurgopsis* by the anterior orbitals being directed backwards, and by the presutural bristle being stronger; but his figure (*op. cit.*, p. 122, fig. 38) shows the anterior orbitals curved inwards at the tips as in *Panurgopsis*. The strength of the presutural bristle is of little importance in this group; only its total absence is worth considering as a generic criterion, and even where it is normally absent it is sometimes weakly represented.

In the paper dealing with Oriental Sapromyzidae which is referred to on p. 201 above, I have included a synopsis of the genera related to *Panurgopsis*, and the Samoan species run satisfactorily to it in the key.

In the Samoan material there appear to be representatives of only one rather variable species, which is described below as new.

12. *Panurgopsis quadriseriata*, sp. n.

♂♀. Pale testaceous yellow, slightly shining. *Frons* at vertex about one-third as wide as head, its length about 1.5 as great as its width, hairy in front, and with bristles as in *P. (Prochaetops) nigriseta* Bezzi, postverticals well below vertex, in other respects as that species. Ocellar spot black, a dark brown mark between each antenna and eye, and sometimes two small dark dots on centre of labrum. Thorax with dorsum largely fuscous, with a broad pale central vitta extending over apex of scutellum and centre of postnotum, lateral margins of mesonotum yellow, dark sublateral portions varying from brown to blackish, always darker along pale stripe; sternopleura with a dark mark on upper anterior portion: 1+2 dorsocentrals, intradorsocentral hairs biseriate, sternopleurals 2; scutellum slightly flattened on disc. *Abdomen* ovate, with four series of black dorsal spots on anterior margins of tergites, faint in immature examples. *Legs* normal, yellow. *Wings* as in *P. nigriseta*, hyaline. *Halteres* with yellow knobs.

Length, 3–3.5 mm.

Savaii: Salailua, rain forest, 2,000–4,000 feet, 1 ♀, type, 17.v.1924 (Bryan). Safune, lower forest, 1,000–2,000 feet, allotype and 1 ♂ paratype, 4.v.1924 (Bryan). Tutuila: Leone Road, paratype ♀, 19.ii.1924 (Bryan). Upolu, paratype ♀, 3.vi.1924. Type in the Bishop Museum.

The last-mentioned specimen is immature and lacks definite dark spots on the abdomen.

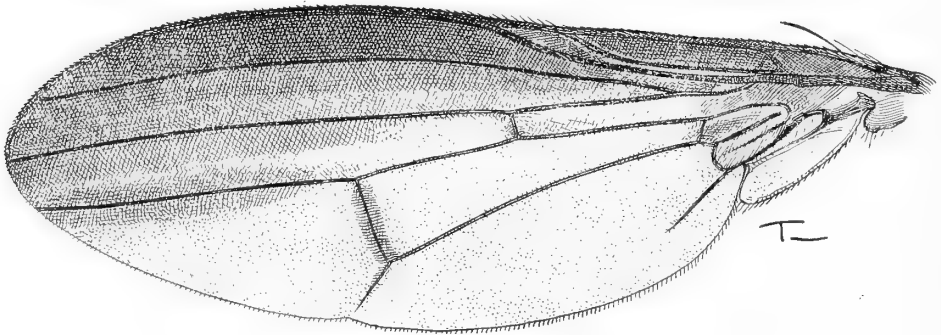
The Fijian species *P. nigriseta* Bezzi has a large, blackish, central spot on the lower margin of the face, and the fore legs from the tips of the femora to those of the tibiae black or fuscous.

Trigonometopus Meigen.

The single species of this genus represented in the collection before me is practically normal as regards generic characters, the face receding greatly below, and the presutural (posthumeral) bristle being absent, or represented by a short setula. I am unable to identify this species among those already described, and therefore consider it new to science. Although not recorded by Bezzi as occurring in Fiji, the genus is found in Europe, North and South America, Asia, many of the islands between that continent and Australia, and also in Australia itself.

13. *Trigonometopus semibrunnea*, sp. n. (Text-fig. 6).

♂♀. Testaceous yellow, slightly shining. *Frons* over twice as long as its width at upper angles of eyes, clothed with hair throughout entire length in centre, and entire width in front, ocellars and postverticals small; face much



TEXT-FIG. 6.—*Trigonometopus semibrunnea*, sp. n. Wing.

receding below, epistoma in profile about middle of head, antennae normal; arista pubescent. Ocellar spot brown, sometimes a similarly coloured central streak extending from it to anterior margin of frons; occiput fuscous except on each side of central dark mark, a dark brown mark between each antenna and eye; antennae brownish testaceous; arista black; palpi testaceous yellow;

all cephalic hairs black. *Thorax* as in genotype, but presutural bristle sometimes weakly represented; intradorsocentral hairs in 6-8 series. Thorax largely fuscous, mesonotum with a central vitta, varying in width, extending over disc of scutellum, and usually a narrow vitta anteriorly along each series of dorso-central bristles, testaceous yellow; sutures of pleurae pale. *Abdomen* rather stout, hypopygium of ♂ prominent; dorsum fuscous, a central pale vitta may be complete or evident only at base, or at base and apex; venter, including broadly incurved portions of tergites, testaceous yellow. *Legs* normal, entirely testaceous. *Wings* as shown in text-fig. 6, hyaline, deep brown along entire costa, shading off at fourth vein, both cross-veins narrowly clouded with brown. *Halteres* testaceous yellow, knobs fuscous.

Length, 5 mm.

Tutuila: Pago Pago, type ♂, 14.xii.1925. Upolu: Vailima, allotype, 12.xii.1925; same locality, paratype ♂, 2.ii.1925; Malololelei, 2,000 feet, paratype ♂, 20.vi.1924 (Buxton and Hopkins); Tuaefu, paratype ♂, 16.ix.1923 (Swezey and Wilder). Savaii: Safune, rain forest, 2,000-4,000 feet, paratype ♀, 2.v.1924 (Bryan).

LIST OF TEXT-FIGURES

- Text-fig. 1. *Trypancoides samoensis*, sp. n. Wing.
 „ 2. „ *puncticeps*, sp. n. Wing.
 „ 3. *Homoneura anthracina*, sp. n. ♂ hypopygium.
 „ 4. „ *nigricauda*, sp. n. „
 „ 5. „ *apiseriata*, sp. n. „
 „ 6. *Trigonometopus semibrunnea*, sp. n. Wing.

INSECTS OF SAMOA

AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

LIST OF PARTS AND SYSTEM OF PUBLICATION:—

- Part I. Orthoptera and Dermaptera.
 „ II. Hemiptera.
 „ III. Lepidoptera.
 „ IV. Coleoptera.
 „ V. Hymenoptera.
 „ VI. Diptera.
 „ VII. Other Orders of Insects.
 „ VIII. Terrestrial Arthropoda other than Insects.
 „ IX. Summary and Index.

The work is published at intervals in the form of numbered fascicles. Although individual fascicles may contain contributions by more than one author, each fascicle is so arranged as to form an integral portion of one or other of the Parts specified above.

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